

Physical composition and its relationship to the physical fitness of combat sports players

Ahmed Hamdy Mohamed Khidr*

Introduction and research problem:

Sports in the era in which we live are practiced for two basic goals: sports for health and the prevention of diseases. At the forefront of these diseases is lack of movement, and the second goal is sports for the sake of championship. Sports are considered a double-edged sword. If sports are practiced while neglecting the health aspect, harmful effects will result. Healthy, so sports practice must be regulated in accordance with sound health principles. (12: 5, 6)

Physical measurements are considered one of the individual characteristics that are highly linked to reaching the highest levels of sports. These requirements are reflected in the qualities that must be present in those who practice this activity, and the availability of these qualities among practitioners gives a greater opportunity to absorb the basic skills of this sport, as it has become of great importance to have appropriate bodies as one of the basic pillars. These must be available to enable players to reach high sporting levels. (10: 9)

The components of the body are the basis for every sporting activity, and improving the level of performance in these activities depends on the extent to which players are selected according to their physical standards. Measurements for studying the components of the body, including

fat, bones, and muscles, have attracted the attention of many scientists at the present time, as it is possible to identify the effect of exercise on the body. Man through the components of the body. (19: 42)

The human body usually consists of several different tissues, most of which are bone, muscle, and fatty tissues that constitute the various body systems. As the bone tissue is characterized by almost stability under the influence of training, most of the focus is on muscle and fatty tissues due to the speed of their effect and the increase or decrease in human movement and activity. (2: 75)

The body composition refers to the components of the body, including fats, muscles, bones, fluids, minerals, etc. The components of the body are usually divided into adipose mass and non-adipose mass, which includes muscles, bones, minerals, connective tissue, and cartilage. There are methods through which the components of the body can be calculated in accurate ways using modern devices and unconventional methods that determine the components in a relative manner, and the nature of the player's physical composition has a noticeable impact on his health and performance. (25: 2)

Body composition is of great importance as it is one of the components of physical fitness for

* Lecturer in the Department of Sports Health Sciences, Faculty of Physical Education - Benha University

health and physical fitness and for developing the level of motor performance. Many researchers have emphasized that the importance of body composition is evident through several things, including (the connection between health status and body composition, as increasing obesity or increasing thinness means... More health problems for the individual and decreased physical fitness, the link between sports performance and body composition. The level of sports performance in various sports activities is largely linked to the quality of body composition, as the nature of bodies and the proportions of fat and muscle in them vary depending on the type of specialized sports activity, and the connection of body composition to nutrition, as the type and nature Food has a positive and negative effect on the components of the player's body and may lead to progress or decline in level. Body composition is linked to injury prevention. Body composition plays an essential role in injury prevention. It is noted that increasing obesity in some individuals means losing many elements of physical fitness and difficulty moving. The limbs of the body over the entire extent of the joint, as well as in the case of excessive thinness. All of these factors help in the occurrence of injuries. The connection between body composition and selection. Body composition contributes very significantly to the process of selecting individuals to practice appropriate sports. It can also contribute to the selection of some different activities that require...

Certain physical specifications, even within specialized sports activities. (4: 9-10)

Safaa Al-Kharboutli (2016) points out that studying the physical structure of individuals is of great importance as it reflects the state of physical development and health level, as the way the body is built, height and weight are all factors that cannot be ignored, but it is necessary to pay attention to them to achieve better strength and health so that society is more advanced in It improves the psychological state of individuals with a healthy physique and thus has a greater ability to think. (11: 153)

Tawfiq Ibrahim (2007) adds that physical preparation plays an effective role in player preparation programs, as it is considered a means that leads to raising the level of general and specific physical fitness in proportion to the nature of performance in order to reach the best possible athletic level, which leads to achieving the best results. (8: 2)

Wajih Ahmed Shamandi (1995), citing Verkhechanesky, points out that in the sports field, physical qualities or abilities must be interconnected with the components of good technical performance, as the effectiveness of sports skill improvement is essentially linked to the process of coordination between the art of performance with methods of training physical qualities or physical preparation of athletes. Skillful preparation is related to learning a movement or skill, and physical preparation is related to training physical attributes. (21: 265)

Muhammad Hassan Allawi (1994) confirms that behind the models of good skill performance are abilities related to the athlete's preparations. He cannot master the basic skills for the type of activity in which he specializes if he lacks the special physical abilities for this activity. (16: 288)

Ibrahim Ahmed Salama (2010) explains that physical fitness related to health is a continuous series of multifaceted activities extending from birth to death, influenced by physical activity whose range ranges from maximum capabilities for all aspects of life up to illness and functional dysfunction. (1: 240)

Physical fitness is crucial to better performance and success for combat sports players. However, a group of players in these sports suffer from a pressing issue related to a lack of physical fitness. The researcher attributes this lack to the major physical changes that occur in their bodies. These changes include indicators such as mass. Body, fat percentage, muscle mass, skeletal structure, and metabolism. These complex changes affect physical performance and athletic performance in general, and based on the researcher's observation of this problem, and through his being a member of the Public Service Center for Physical Efficiency and Research at the Faculty of Physical Education, Benha University and among the officials. By following up on academies and gyms in college, and through his follow-up of academies for combat sports, he discovered that there is an urgent need for an extensive scientific study that sheds light on understanding body composition and its relationship to

the physical fitness of these athletes. Accordingly, the researcher designed this study with the aim of measuring and analyzing the body composition of combat sports players and revealing the relationship between these variables and their level of physical fitness.

Research objective: This research aims to identify:

- 1- The level of physical formation of combat sports players.
- 2- Physical fitness for combat sports players.
- 3- Physical composition and its relationship to the physical fitness of combat sports players.

Research questions:

- 1- What is the level of physical composition of combat sports players (research sample)?
- 2- What is the level of physical fitness of combat sports players (research sample)?
- 3- Is there a relationship between the physical composition and physical fitness of combat sports players (research sample)?

Definitions used in the research:

- **Physical composition:** This means the components of the body, including fats, muscles, bones, fluids, minerals, etc. The components of the body are usually divided into adipose and non-adipose mass, including muscles, bones, minerals, connective tissue, and cartilage. (26: 14)

- **Body components:** It is a term that refers to the proportions of the presence of adipose tissue and fat-free tissue, i.e. body fat mass and fat-free body mass. (3: 172)

- **Physical fitness:** means the body's efficiency in facing the demands of life, and this requires the integrity of the

nervous and muscular systems, the circulatory and respiratory systems, and the internal organs. It also requires good fitness, consistent body measurements, and freedom from diseases. (17: 4)

- **Combat sports:** They are combat or competitive sports characterized by excitement. In some of these sports, clashes are allowed due to the presence of a group of traditional and unconventional combat methods that are carried out in accordance with rules and laws that maintain the safety of the players. (6: 4)

Reference studies:

Arabic reference studies:

1- A study by **Damdum Hamo Hameed (2020)(9)** titled Study of the Characteristics of Some Physical Measurements and the Results of Physical Tests at Different Stages of Physical Development for a Child 6-11 Years Old. The research aims to clarify the differences in some physical measurements and results of physical tests according to the stages of growth for a child 6-11 years old. And to identify the differences between some physical measurements and the results of physical tests between the sexes, and the correlation between some physical measurements and the results of the physical tests under study. The researcher used the descriptive approach in the style of correlational studies due to its suitability to the nature. The researcher selected the research sample in a random way from the research community, which is represented by students. The primary stage from 6-11 years of age, which numbered (126), including (61) male students and (65) female students. The most important results showed differences in the rate of growth of height

and weight depending on age, in addition to indicating periods of stagnation in height and weight. There are also differences in the rate of growth of physical measurements (chest circumference, upper arm circumference, thigh circumference), and there are differences in favor of females over males in the variable of height and weight, category (6-9) years. There are also differences in favor of males over females in the variable of torso flexibility, category (9-11.) years, and there is a direct correlation in males and females between explosive strength and all the physical measurements under study.

2- **Walaa Osama Muhammad Rashad's study (2020)(22)** entitled The effectiveness of a rehabilitation program to improve the physical and physical fitness of primary school students. The research aims to build a proposed rehabilitation program and improve the physical and physical fitness and the effectiveness of the proposed rehabilitation program on the physical and physical fitness of primary school students. The researcher used the method Experimental due to its suitability to the nature, and the researcher chose the research sample intentionally from the research population, which is represented by primary school students in the fifth grade of Siam Primary School, which numbered (52) students (boys). The most important results showed that the rehabilitation program using floor exercises has a positive impact. To develop the physical and physical fitness level of students. There were statistically significant differences between the pre and post measurements of the experimental group in all variables of the

physical fitness level (muscular strength - coordination - agility - flexibility - speed - endurance), and there were statistically significant differences in all variables of the physical fitness level (body fat percentage - body mass index - muscles). Hand grip - leg muscles - back muscles) in the direction of dimensional measurement.

3- **Ahmed Suleiman Muhammad (2014)(4)** conducted a study entitled "Physical composition and its relationship to the level of physical and skill performance among water polo players in the State of Kuwait." The research aims to identify the physical composition and its relationship to the level of physical and skill performance among water polo players in the State of Kuwait. The researcher used the descriptive approach using the survey method. The study sample consisted of water polo players registered in the clubs of the State of Kuwait and the Kuwaiti Swimming Federation in the clubs (Al-Shabab - Al-Khaitan - Al-Qadisiyah - Al-Kadhimah - Al-Arabi - Kuwait - Al-Nasr - Al-Jahra - - Al-Sahel - Salmiya - Yarmouk), and their number was (143). Player, and among the most important results - there are statistically significant differences between the three groups of water polo players according to the level of skill performance in water polo in all measurements of body composition and in favor of the high-level group.

Foreign reference studies:

1- **Ben Coetze And others. E Other (2012) (24)** A study entitled "The relationship between sports participation, motor performance, and body composition for a selected group of 10th grade adolescents." The research aims to

identify the relationship between sports participation, motor performance, and body composition for a selected group of 10th grade adolescents, and the researcher used the method Descriptive using the survey method. The study was conducted on a sample of (201) learners in the tenth grade (82) boys and (119) girls from (6) secondary schools. The results showed that there were clear statistically significant differences in favor of those participating in sports over non-participants in sports. (Body mass - fat mass - fat-free mass) in addition to (upper arm circumference - thigh circumference - waist ratio). There are no statistically significant differences between the rest of the anthropometric measurements and body composition variables between sports participants and non-participants.

2- **A study by Makama Andries, Makam (2012) (27)** entitled The relationship between body composition and physical fitness among adolescents 14 years old and residing within the municipality of Telukia, South Africa. The research aims to identify the extent of the relationship between body composition and physical fitness among adolescents 14 years old and residing within the municipality. Telukia and South Africa. The researcher used the descriptive approach. The study was conducted on a sample of (256) adolescents, (100) males and (156) females. The results showed that (35.9%) of adolescents suffer from underweight, while (13%) 7% are overweight. The prevalence of being overweight in males was (8%) and (17.3%) in females.

Research Methodology: The researcher used the descriptive method as it suits the

nature of the research.

Research sample: The research sample included (50) home sports players (first division - international), whose ages ranged between (17: 19) years. They were selected from (Al-Sharqia Club, Al-

Sekka Al-Hadid Club, Banha Sports Club), and the sample size was (50) players, and (30) players were used to conduct the survey, so the research sample became (80) players.

Table (1)
Description of the research sample

percentage	the number	Sports	the sample	percentage	the number	Sports	the sample
% 20	6	Wrestling	Exploratory sample	%20	10	Wrestling	Basic sample
% 20	6	boxing		%20	10	boxing	
% 20	6	Judo		%20	10	Judo	
% 20	6	Kung Fu		%20	10	Kung Fu	
% 20	6	Taekwondo		%20	10	Taekwondo	
% 100	30	the total		% 100	50	the total	

Conditions for selecting a research sample:

- 1- The player's conscious understanding of the importance of this research and what it will yield in the future.
- 2- The player must be a first-class or international champion and have previously won championships in his sport.

- 3- The player undergoes a medical examination to ensure that he is free of diseases that may affect the results of measuring the research variables and the ability to engage in activity and continue

Homogeneity of the research sample:**Table (2)**

Homogeneity of the research sample members in the variables under study
n=80

Skewness	Std. Deviation	Median	Mean	Variables	
0.30-	0.87	18.00	18.15	Chronological age	
1.30-	0.93	4.00	3.38	Training age	
1.29	1.37	28.00	28.88	BMI	Body composition measurements
0.01	0.63	30.00	29.99	Muscle ratio	
1.29	0.79	54.00	54.46	Water ratio	
0.80	3.11	34.00	35.59	Fat percentage	
0.97	53.02	1619.00	1656.05	Metabolic rate	
0.66	1.13	8.00	8.00	Bend arms test (muscular endurance)	Physical measurements
0.94	0.75	7.00	6.89	Vertical jump standing with knees half bent (muscular endurance)	

Follow Table (2)
Homogeneity of the research sample members in the variables under study
n=80

Skewness	Std. Deviation	Median	Mean	Variables
0.56	2.10	36.50	37.03	Right grip strength test (muscle strength)
0.02	1.98	30.00	30.64	Left fist strength test (muscle strength)
0.08-	0.11	1.90	1.86	Broad jump test of stability (muscular strength)
0.40-	0.57	4.60	4.54	Test of throwing a medicine ball for the maximum distance (muscular strength)
0.27-	8.80	80.00	76.28	Static balance test (balance)
0.42-	0.86	4.00	4.03	Right arm ball balance test (balance)
0.58-	0.48	3.00	2.64	Left arm ball balance test (balance)
0.03	0.63	9.73	9.83	Multi-faceted running test (agility)
1.18	1.98	19.00	19.19	Arm movement in the horizontal direction (speed)
0.35-	1.30	13.00	12.60	Testing the movement of the leg in the horizontal direction (speed)
0.46	1.08	9.00	9.34	Trunk forward bending test from standing (flexibility)
1.20	3.37	57.00	59.38	Standing torso flexion test (flexibility)
0.04	1.53	24.00	24.11	Parallel barbell sitting test (flexibility)
0.53-	1.15	7.00	6.99	Test of aiming by hand on overlapping circles (accuracy)
1.54	0.66	16.00	16.11	Throwing and receiving balls test (compatibility)

It is clear from Table (2) that the values of the skewness coefficients in the research variables ranged between (-1.30, 1,54) and are values limited to ± 3 , which indicates the homogeneity of the data for the individuals of the basic study sample in the selected variables,

which could affect the value of the variables in question.

Tools and means of collecting data: In light of the research requirements and objectives, the researcher used some devices and tools in order to achieve the research

measurements, including physical composition measurements and physical fitness measurements, according to the multiple and different research variables, where the researcher conducted a reference survey and reviewed the specialized scientific references, and the network.

- Measuring tape.
- Adhesive tape.
- Thread.
- Funnels.
- Flat table.
- Wooden box, 40 cm high.
- Leather belt.
- Stop watch.
- Chair without back.
- Tennis balls.

Devices used in the research:

- Body Composition device to measure body composition variables.
- inbody device.
- Manometer device to measure grip strength.
- device consisting of two wooden circles lined with leather and placed horizontally.
- A device consisting of a board with a crossbar fixed in the middle, 18 inches long and 6 inches high.

Forms used in the research:

- Data registration form. Attachment (3)
- Expert opinion poll form on body composition measurements that are appropriate to the nature of the research. Attachment (4)
- Expert opinion poll form on the elements of physical fitness and its tests that are appropriate to the nature of the research. Attachment (5)

Measurements used in the research: attached (6)

Body composition measurements:

- Body mass index.
- Muscle ratio.
- Water percentage.
- Fat percentage.

International Information and other sources of information to learn about methods for measuring research variables.

Tools and devices used in the research: attached (2)

Tools used in the research:

- Rubber rope.
 - Medicine ball.
 - Basketball.
 - 30 cm ruler.
 - Metabolic rate. (4: 31)(20: 78-81)
- #### **Physical measurements:**
- Testing the bending of the arms from a horizontal position (muscular endurance).
 - Vertical jump from standing with knees bent in half (muscular endurance).
 - Right grip strength test (muscle strength).
 - Left fist strength test (muscle strength).
 - Broad jump test of stability (muscular strength).
 - Test of throwing a medicine ball the maximum distance (muscular strength).
 - Static balance test (balance).
 - Right arm ball balance test (balance).
 - Left arm ball balance test (balance).
 - Multi-faceted running test (agility).
 - Movement of the arm in the horizontal direction (speed).
 - Testing the leg's movement in the horizontal direction (speed).

- Testing bending the torso forward from standing (flexibility).
- Testing flexion of the torso from standing (flexibility).
- Parallel barbell sitting test (flexibility).
- Testing aiming by hand on overlapping circles (accuracy).
- Test of throwing and receiving balls (compatibility).

(17: 209, 347, 348)(20: 31, 35)(5: 115)(15: 65)

Survey: The exploratory study was conducted from Saturday, 12/18/2021, to Thursday, 12/23/2021, with a sample of (30) players represented in the exploratory sample, **in order to ensure:**

- The extent of understanding and clarity of measurements.

- Calculating scientific transactions (validity - reliability).

Scientific parameters for the measurements used in the study:

Validity of the concept (configuration): The researcher calculated the validity of the physical composition measurements and the physical measurements under study using the validity of the concept or construct type, “differences between groups,” using the validity of the lower quartile and the upper quartile, where a sample of (24) players was taken from the exploratory sample that underwent the tests under study, and this is shown in Table (3).

Table (3)

The arithmetic mean, standard deviation, “t” value, and its significance between each The lower spring and the upper spring n=24

"t" value	"F" value	Upper spring		Lower spring		Variables	
		Std. Deviation	Mean	Std. Deviation	Mean		
5.53	4.67	1.26	25.00	1.63	29.67	BMI	Body composition measurements
8.02	5	1.17	34.83	0.98	29.83	Muscle ratio	
4.50	3.50	1.63	58.33	0.98	54.83	Water ratio	
4.21	5.67	0.84	30.50	3.19	36.17	Fat percentage	
7.57	130.67	31.06	1762.17	31.06	1762.17	Metabolic rate	
10.51	4.50	0.84	11.50	0.63	7.00	Bend arms test (muscular endurance)	Physical measurements
8.77	3.33	0.84	9.50	0.41	6.17	Vertical jump standing with knees half bent (muscular endurance)	
10.44	8.67	1.63	42.33	1.21	33.67	Right grip strength test (muscle strength)	
6.57	7.33	2.58	33.33	0.89	26.00	Left fist strength test (muscle strength)	

Follow Table (3)
The arithmetic mean, standard deviation, "t" value, and its significance
between each The lower spring and the upper spring n=24

"t" value	"F" value	Upper spring		Lower spring		Variables
		Std. Deviation	Mean	Std. Deviation	Mean	
5.89	0.55	0.22	2.17	0.08	1.62	Broad jump test of stability (muscular strength)
5.05	1.35	0.52	5.17	0.40	3.82	Test of throwing a medicine ball for the maximum distance (muscular strength)
6.73	29.17	9.27	102.50	5.16	73.33	Static balance test (balance)
5.06	2.67	1.17	5.17	0.55	2.50	Right arm ball balance test (balance)
11.31	2.67	0.41	4.83	0.41	2.17	Left arm ball balance test (balance)
6.57	2.10	0.22	9.07	0.75	11.17	Multi-faceted running test (agility)
15.44	9.83	1.03	24.67	1.17	14.83	Arm movement in the horizontal direction (speed)
6.71	5	1.37	14.67	1.21	9.67	Testing the movement of the leg in the horizontal direction (speed)
13.06	7.67	1.05	14.50	0.98	6.83	Trunk forward bending test from standing (flexibility)
9.91	15	1.03	45.33	3.56	60.33	Standing torso flexion test (flexibility)
11.57	9.17	1.75	14.33	0.84	23.50	Parallel barbell sitting test (flexibility)
10.57	6	1.33	11.17	0.41	5.17	Test of aiming by hand on overlapping circles (accuracy)
5.86	4	0.89	15.00	1.41	11.00	Throwing and receiving balls test (compatibility)

The tabular "t" value has a degree of freedom (10), and a level of 0.01 = 3.169

The tabulated "t" value is at a degree of freedom (10), and the level of 0.05 = 2.228

It is clear from Table (3) that the calculated "t" value is greater than the tabulated "t" value at a degree of freedom (10) and a significance level (0.01), which indicates that the "t" value is statistically significant between the lower quartile and the upper quartile, which indicates that The test has the ability to show differences between groups.

Stability: The researcher calculated the stability of the physical and skill

tests under study using (Test - Retest), application and reapplication with an interval of (5) days between the two applications, where a sample of (30) players was taken, represented by the exploratory sample, with the same measurements, under the same conditions, and using the same tools, and a table (4) It shows the reliability coefficients for the tests under study.

Table (4)
Correlation coefficients between application and reapplication values,
exploratory sample n=30

"R" value	Second application		First application		Variables	
	Std. Deviation	Mean	Std. Deviation	Mean		
**0.965	1.37	29.17	1.44	29.00	BMI	Body composition measurements
**0.903	0.80	30.10	0.72	29.97	Muscle ratio	
**0.910	0.81	54.63	0.82	54.50	Water ratio	
**0.996	2.97	35.93	3.12	36.03	Fat percentage	
**0.494	6494.76	5530.97	55.58	1664.37	Metabolic rate	
**0.953	1.11	7.87	1.14	7.73	Bend arms test (muscular endurance)	Physical measurements
**0.867	0.82	6.77	0.72	6.97	Vertical jump standing with knees half bent (muscular endurance)	
**0.965	2.27	36.93	2.20	37.10	Right grip strength test (muscle strength)	
**0.979	1.99	30.37	1.97	30.17	Left fist strength test (muscle strength)	
**0.936	0.12	1.84	0.12	1.85	Broad jump test of stability (muscular strength)	
**0.989	0.62	4.58	0.59	4.54	Test of throwing a medicine ball for the maximum distance (muscular strength)	

Follow Table (4)
Correlation coefficients between application and reapplication values,
exploratory sample n=30

"R" value	Second application		First application		Variables
	Std. Deviation	Mean	Std. Deviation	Mean	
**0.986	8.14	77.90	8.60	77.63	Static balance test (balance)
**0.925	0.81	3.80	0.91	3.93	Right arm ball balance test (balance)
**0.764	0.51	2.47	0.50	2.60	Left arm ball balance test (balance)
**0.943	0.78	9.58	0.72	9.71	Multi-faceted running test (agility)
**0.967	2.10	19.50	2.19	19.47	Arm movement in the horizontal direction (speed)
**0.955	1.25	12.57	1.35	12.67	Testing the movement of the leg in the horizontal direction (speed)
**0.939	1.15	9.67	1.17	9.47	Trunk forward bending test from standing (flexibility)
**0.969	3.28	59.67	3.36	59.37	Standing torso flexion test (flexibility)
**0.983	1.85	23.53	1.84	23.67	Parallel barbell sitting test (flexibility)
**0.955	1.26	6.73	1.36	6.93	Test of aiming by hand on overlapping circles (accuracy)
**0.650	0.74	16.00	0.71	16.20	Throwing and receiving balls test (compatibility)

**There is a correlation at the 0.01 level; Where the value of (R) is at the level of 0.01 at the degree of freedom (29) = 0.456

*There is a correlation at the 0.05 level; Where the value of (R) is at the level of 0.05 at the degree of freedom (29) = 0.355

It is clear from Table (4) that the calculated "R" value is greater than the tabulated "R" value at a degree of freedom (29) and a significance level

(0.01); Which indicates that the "R" value is statistically significant between the first application and the

second application, which indicates that the test is stable.

Basic study: The basic study was conducted by applying body composition measurements and the physical measurements under study to the basic research sample, which consisted of (50) combat sports players, divided into (10 wrestling players, 10 boxing players, 10 judo players, 10 kung fu players, 10 taekwondo players). This is during the period from Monday, corresponding to 3/1/2022, to Monday, corresponding to 10/1/2022.

Statistical processors: After collecting data and recording the various measurements of the variables used in this study, appropriate statistical treatments were performed to achieve the objectives and ensure the validity of the hypotheses using

statistical laws, as well as the computer through the statistical program "Excel" belonging to the documented software package "Microsoft Office". The researcher also used The statistical program "IBM SPSS Statistics Data Editor 25", in order to obtain the statistical treatments required by the study, and these processors are:

- Mean
- Median
- Std. Deviation
- Skewness
- Kurtosis
- "R" value
- "T" value

- 95% Confidence Interval for Mean

Presentation and discussion of results:

Presentation and discussion of the results of the first question:

Which states: What is the level of physical composition of combat sports players (research sample)?

Table (5)

Level of physical composition of combat sports players (research sample) n = 50

Kurtosis	Skewness	Std. Deviation	Median	95 %Confidence Interval for Mean		Mean	Variables	Body composition measurements
				Upper Bound	Lower Bound			
0.31-	1.09	1.43	28	29.41	28.59	29	BMI	
0.67-	0.05	0.67	30	30.15	29.77	29.96	Muscle ratio	
0.41-	1.18	0.81	54	54.73	54.27	54.50	Water ratio	
0.91-	0.72	3.09	35	36.64	34.88	35.76	Fat percentage	
0.65-	0.89	53.96	1619.50	1674.16	1643.48	1658.82	Metabolic rate	

Table (5) shows the level of physical composition of combat sports players (research sample), where the level of physical composition included (body mass index measurements,

muscle percentage, water percentage, fat percentage, metabolic rate) where the confidence interval for the arithmetic mean ranged at 95% between (28.59: 29.41) in body mass

index, between (29.77: 30.15) in muscle percentage, and between (54.27: 54.73) in water percentage, and between (34.88: 36.64) in fat percentage, and (1643.48: 1674.16) in metabolic rate..

Ihab Muhammad Imad El-Din (2016) explains that significant changes in body composition can occur by practicing sports activity for a continuous period of time, as this works to increase fat-free mass and reduce fat mass in the body, and the size of these changes depends greatly on the type of exercise. used in the program. (7: 412)

Wilmore & Consill (2005) believe that body composition includes two components: body fat and fat-free body mass. As for muscle and fat composition, it has been observed that differences appear between individuals in these two components because of their close connection to human movement and activity. In the field of sports physiology, scientists have agreed on Distinguishing two basic components of the body when comparing this area.(30: 99)

Both Youssef Kamash and Saleh Bashir (2011) (23) agree that appropriate fitness increases the possibility of changing the outcome of

sports training and physical efficiency within the limits of the individual's athletic body style and composition, by increasing muscle mass and reducing body fat in order to obtain the highest level. of efficiency during performance in training or a match, and this is consistent with what was stated by Laith Al-Agha (2013) (14) The more the individual's style tends towards the muscular style, the better the performance will be, and vice versa, increasing the percentage of fat affects the performance significantly and clearly.

The researcher attributes this to the fact that combat sports players must have a body composition that suits the requirements of the sport they practice. Players must also adhere to certain weight limits, because they may have a body composition that hinders their physical fitness.

Thus, the first question has been answered, which states: What is the level of physical composition of combat sports players (research sample)?

Presentation and discussion of the results of the second question:

Which states: What is the fitness level of combat sports players (research sample)?

Table (6)
Fitness level of combat sports players (research sample) n=50

Kurtosis	Skewness	Std. Deviation	Median	95 %Confidence Interval for Mean		Mean	Variables
				Upper Bound	Lower Bound		
0.45	0.65	1.13	8	8.22	7.58	7.90	Bend arms test (muscular endurance)
1.89	0.87	0.70	7	7.12	6.72	6.92	Vertical jump standing with knees half bent (muscular endurance)

Follow Table (6)
Fitness level of combat sports players (research sample) n=50

Kurtosis	Skewness	Std. Deviation	Median	95 %Confidence Interval for Mean		Mean	Variables
				Upper Bound	Lower Bound		
1.09-	0.56	2.09	36.50	37.62	36.42	37.02	Right grip strength test (muscle strength)
1.63	0.20	1.83	30	31.00	29.96	30.48	Left fist strength test (muscle strength)
0.49	0.01-	0.11	1.90	1.89	1.82	1.85	Broad jump test of stability (muscular strength)
1.14-	0.39-	0.59	4.60	4.70	4.36	4.53	Test of throwing a medicine ball for the maximum distance (muscular strength)
0.95-	0.29-	8.81	80	79.04	74.04	76.54	Static balance test (balance)
0.36-	0.54-	0.84	4	4.30	3.82	4.06	Right arm ball balance test (balance)
1.81-	0.51-	0.49	30	2.76	2.48	2.62	Left arm ball balance test (balance)
0.08	0.09-	0.68	9.73	10.01	9.63	9.82	Multi-faceted running test (agility)
2.16	1.32	1.93	19	19.71	18.61	19.16	Arm movement in the horizontal direction (speed)
1.16-	0.24-	1.31	13	12.95	12.21	12.58	Testing the movement of the leg in the horizontal direction (speed)
1.41-	0.27	1.16	9	9.77	9.11	9.44	Trunk forward bending test from standing (flexibility)
2.17	1.86	3.06	57	59.55	57.81	58.68	Standing torso flexion test (flexibility)
1.22	0.14-	1.70	24	24.50	23.54	24.02	Parallel barbell sitting test (flexibility)
0.38-	0.54-	1.25	7	7.34	6.62	6.98	Test of aiming by hand on overlapping circles (accuracy)
3.84	1.65	0.66	16	16.31	15.93	16.12	Throwing and receiving balls test (compatibility)

Table (6) shows the level of physical fitness for combat sports players (research sample), where the level of physical fitness included (arms bending test from horizontal prone, vertical jump from standing with knees bent half, right fist strength test, left fist strength test, broad jump test From stability, the test of throwing a medicine ball for the maximum distance, the static balance test, the "right arm" ball balance test, the "left arm" ball balance test, the multi-directional running test, the arm movement in the horizontal direction, the leg movement test in the horizontal direction, the torso flexion test. Forward from standing, torso bending backward from standing test, parallel leg sitting test, hand aiming test on overlapping circles, throwing and receiving balls test).

The confidence interval for the arithmetic mean at 95% ranged between (7.58: 8.22) in the test of bending the arms from lying horizontally (muscular endurance), (6.72: 7.12) in the vertical jump from standing with the knees bent half (muscular endurance), (36.42: 37.62). In the right grip strength test (muscular strength), (29.96: 31) in the left fist strength test (muscular strength), (1.82: 1.89) in the standing broad jump test (muscular strength), (4.36: 4.7) in the ball throwing test Medical for maximum distance (muscular strength), (74.04: 79.04) in the static balance test (balance), (3.82: 4.3) in the right arm ball balance test (balance), (2.48: 2.76) in the left arm ball balance test (Balance), (9.63: 10.01) in the multi-directional running

test (agility), (18.61: 19.71) in the arm movement in the horizontal direction (speed), (12.21: 12.95) in the leg movement test in the horizontal direction (speed), (9.11: 9.77) in the torso bending test forward from standing (flexibility), (57.81: 59.55) in the test of bending the torso backward from standing (flexibility), (23.54: 24.5) in the parallel leg sitting test (flexibility), (6.62: 7.34) In the hand-aimed test on overlapping circles (accuracy), (15.93: 16.31) in the test of throwing and receiving balls (compatibility).

The opinions of most sports training scholars have agreed that general physical fitness is the basic component upon which the rest of the components necessary to reach what is known as the sports form are built. Some liken physical fitness in sports activities to the foundation of the house, which represents its basic pillar and upon which all the floors of the house are built, one floor after another. Until it is completed, if the foundation is solid and stable, the house will remain cohesive, strong and solid in the face of all the factors of erosion. However, if the foundation is weak and fragile, then the entire house is at risk of collapsing. Thus, physical fitness in relation to sports activity is the backbone and the broad base that does not accept mere discussion about its importance, because Its importance has become a basic axiom in physical education and sports. (13: 30, 31)

The researcher believes that the availability of physical fitness is considered essential for combat sports players, as the elements of physical

fitness play a decisive role in the performance of players in these sports and their impact on the results. Muscular strength, for example, contributes to the player's ability to deliver stronger strikes and defend oneself effectively. Speed must also contribute to executing tactical movements accurately and effectively. Combat sports players must also have high endurance and comprehensive physical fitness that enables them to withstand for a long time and maintain performance. Throughout the fight, they also need high flexibility to avoid

injuries and adapt to changes in the fight strategy, so fight sports players must work hard to continuously develop their physical fitness.

Thus, the second question has been answered, which states: What is the fitness level of combat sports players (research sample)?

Presentation and discussion of the results of the third question:

Which states: Is there a relationship between the physical composition and physical fitness of combat sports players (research sample)?

Table (7)

Intercorrelations matrix to show the relationship between physical composition and physical fitness For combat sports players (research sample) n=50

Body composition measurements					Variables
Metabolic rate	Fat percentage	Water ratio	Muscle ratio	BMI	
**0.859	**0.958-	**0.884	**0.967	**0.982	Bend arms test (muscular endurance)
**0.832	**0.836-	**0.849	**0.983	**0.874	Vertical jump standing with knees half bent (muscular endurance)
**0.783	**0.937-	**0.870	**0.949	**0.933	Right grip strength test (muscle strength)
**0.823	**0.983-	**0.845	**0.837	**0.948	Left fist strength test (muscle strength)
**0.735	**0.836-	**0.903	**0.854	**0.901	Broad jump test of stability (muscular strength)
**0.855	**0.935-	**0.701	**0.765	**0.933	Test of throwing a medicine ball for the maximum distance (muscular strength)
**0.733	**0.755-	**0.846	**0.922	**0.916	Static balance test (balance)
**0.736	**0.991-	**0.773	**0.883	**0.992	Right arm ball balance test (balance)
**0.910	**0.998-	**0.916	**0.714	**0.731	Left arm ball balance test (balance)

Physical measurements

Follow Table (7)

Intercorrelations matrix to show the relationship between physical composition and physical fitness For combat sports players (research sample) n=50

Body composition measurements					Variables
Metabolic rate	Fat percentage	Water ratio	Muscle ratio	BMI	
**0.738	**0.993-	**0.844	**0.756	**0.826	Multi-faceted running test (agility)
**0.873	**0.845-	**0.724	**0.911	**0.886	Arm movement in the horizontal direction (speed)
**0.878	**0.776-	**0.773	**0.991	**0.735	Testing the movement of the leg in the horizontal direction (speed)
**0.741	**0.815-	**0.856	**0.883	**0.998	Trunk forward bending test from standing (flexibility)
**0.996	**0.725-	**0.744	**0.817	**0.916	Standing torso flexion test (flexibility)
**0.816	**0.903-	**0.884	**0.887	**0.886	Parallel barbell sitting test (flexibility)
**0.947	**0.846-	**0.906	**0.863	**0.825	Test of aiming by hand on overlapping circles (accuracy)
**0.837	**0.936-	**0.911	**0.845	**0.987	Throwing and receiving balls test (compatibility)

**There is a correlation at the 0.01 level; Where the value of (R) at the level of 0.01 at the degree of freedom (49) = 0.3249

*There is a correlation at the 0.05 level; Where the value of (R) is at the level of 0.05 at the degree of freedom (49) = 0.2329

Table (7) shows significant correlation coefficients at the 0.01 level between the physical composition and physical fitness of combat sports players. There was an inverse correlation between fat percentage and fitness level, where the correlation values ranged between (-0.725, -0.998). There is also a direct correlation between body composition variables (body mass index, muscle percentage,

water percentage, metabolic rate) and fitness level, where The correlation values ranged between (0.701, 0.998), and the calculated (R) values were greater than the tabulated (R) value.

The relationship between body composition and components of physical fitness can be complex and depends on many factors, including genetics, diet, level of physical activity, and environmental factors.

But in general, the study by Westerterp, K. R., & Plasqui, G (2009) (29) indicates that there is a positive relationship between physical composition and elements of physical fitness. Increased muscle and decreased fat can have a positive impact on fitness; Increased muscle mass and decreased fat can increase the body's energy consumption rate, which contributes to improving physical fitness and increasing the metabolic rate, and thus there is a direct relationship between body composition (such as increased muscle percentage and decreased fat) and the elements of physical fitness.

The researcher believes that the relationship between metabolic rate and fitness elements can be complex and depends on several factors, and in this study there is a direct (direct) relationship between metabolic rate and fitness elements. This means that individuals who have a higher metabolic rate may have They have a better metabolism and therefore can be less susceptible to weight gain and obesity diseases.

This differs from the study by Müller, M. J., Geisler, (2016) (28), which proved that there is a direct relationship between metabolic rate and weight gain, as individuals who have a high basal metabolic rate may be less likely to gain weight.

Thus, the third question has been answered, which states: Is there a relationship between the physical composition and physical fitness of combat sports players (research sample)?

Conclusions: In light of the goal of the research, what the researcher found from the statistical method used, and what the research resulted in, **the**

researcher drew the following conclusions:

- 1- The level of physical formation of combat sports players was identified.
- 2- An inverse correlation was found between fat percentage and physical fitness level, with correlation values ranging between (-0.725, -0.998).
- 3- A statistically significant direct correlation was found between body composition variables (body mass index, muscle percentage, water percentage, metabolic rate) and the level of physical fitness, where the correlation values ranged between (0.701, 0.998).

Recommendations: In light of the objectives and questions of the research and the sample on which the study was conducted, and based on the results and statistical treatments, **the researcher recommends the following:**

- 1- The need to conduct similar research at different age levels and in other sports.
- 2- The need to pay attention to measuring the physical composition of players on a regular basis.
- 3- Providing the inbody device in all sports clubs, and ensuring that coaches are trained to read the device and deal with the players if there is a defect in any of the components of the physical composition.
- 4- Holding seminars and training courses for physical education students on physical formation.
- 5- There is a need for further studies on the relationship of physical composition to other variables that have an impact on the training process.

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